



Marshall Space  
Flight Center

# Technology Opportunity

---

## Quick-Connect, Slow-Disconnect Nut

---

The National Aeronautics and Space Administration (NASA) seeks to transfer the NASA-developed Quick-Connect, Slow-Disconnect Nut technology to private industry for use in commercial applications. This device was developed at the George C. Marshall Space Flight Center to provide a means of easily assembling components in the weightless environment of space. The nut functions by pushing it onto the end of a bolt rather than threading it on. Once engaged, the only way the nut can be tightened or withdrawn is by turning it the conventional manner, clockwise or counterclockwise respectively.

### Potential Commercial Uses

- ◆ Emergency management (fire & rescue, disaster relief support)
- ◆ Auto manufacturers
- ◆ Industrial machinery & assembly
- ◆ Underwater salvage and construction
- ◆ Military

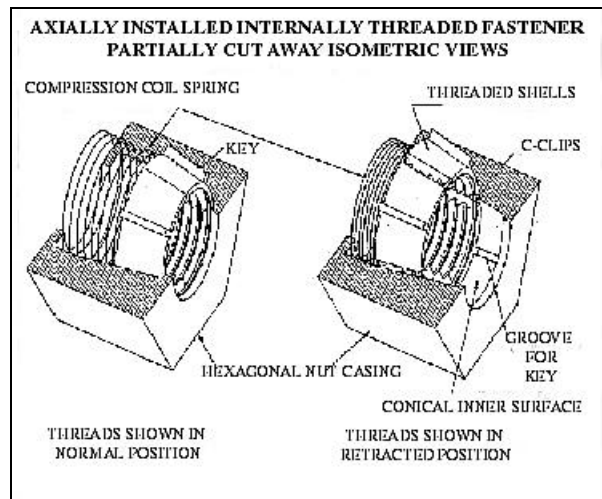
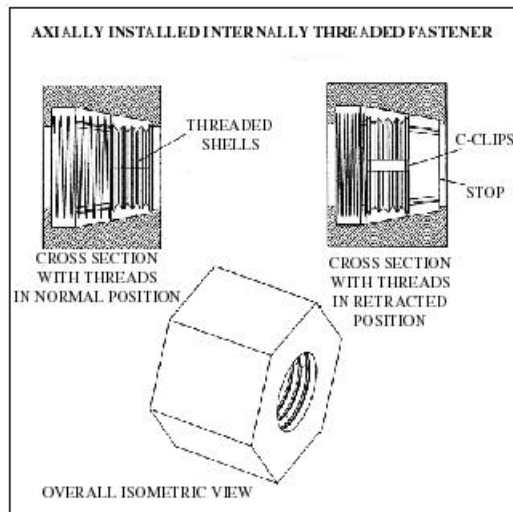
### Attributes

- ◆ Portable as conventional nuts
- ◆ Easy to store
- ◆ Unlimited shelf life
- ◆ Can be used in the same conditions as conventional nuts
- ◆ Advantageous in situations where speed is important
- ◆ Strong as conventional nuts and virtually fail safe

### The Technology

The Quick-Connect, Slow-Disconnect Nut consists of an outside casing, which can have an outside surface of a hexagonal prism or shape and a threaded hole through the center. The unique attribute of the invention is the configuration and function of the threaded hole. The threads of the nut are made onto several shells, which have a conical inner surface, with a raised key protruding radially inward running parallel to the axis of the threaded hole. The shells have a standard thread profile on their cylindrical inner surface and a groove for retaining a spring clip at each end. Two C-shaped spring clips are snapped into all the shells, into a recess at each end, retaining them to the conical surface of the end of the nut. The clips are pre-loaded to force the shells radially outward, down and back along the conical surface of the nut. A coil spring mounted between the back wall of the nut casing and the back surface of the shells is pre-loaded to force the shells towards the end of the nut. Movement of the shells past the end of the nut is prevented by a larger diameter cylindrical stop at the end of the nut. The coil spring pre-load overcomes the opposing force of the C-clips and holds the shells against the stop at the end of the nut.

When the invention is pushed onto a threaded fastener, the threads of the fastener contact the first thread of the shells and drive the shells back, away from the end of the nut, compressing the coil spring. As the shells move away from the stop along the conical surface of the nut, the force of the C-clips urges them radially outward. This increases the inside diameter of the shells to greater than the major diameter of the fastener threads, allowing the shells to slip past the external threads. Once the shells have slid past the first fastener threads, the threads of the shells will be forced towards the end of the nut by the coil spring. The shells are forced radially inward and into engagement with the fastener threads by the conical surface of the inside of the nut casing.



## Options for Commercialization

This technology opportunity is part of the NASA Technology Transfer Program. The program seeks to stimulate development of commercial applications from NASA-developed technology. The Quick-Connect, Slow-Disconnect Nut has been developed, built, and used at MSFC. U.S. patent #5,340,252 has been issued for the device. NASA seeks qualified companies to license and commercialize this technology.

## Contact

If your company is interested in commercializing the Quick-Connect, Slow-Disconnect Nut or if you need additional information, please reference case no. MFS-28833 and contact:

Andy Campbell  
NASA Southeast Regional Technology Transfer Center  
1900 SW 34<sup>th</sup> Street, Suite 206  
Gainesville, FL 32608  
Phone: 1-352-294-7822  
Fax: 1-352-294-7802  
Email: [campbell@eng.ufl.edu](mailto:campbell@eng.ufl.edu)